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Sunday, August 20, 2006

The return of human uniqueness?

There's been a lot of rhetoric about how human genes are only 2% (give or take a wide margin -- there are many ways to count it) different from chimpanzees. Despite all our fancy culture, biologically we're just another mammal, nothing special, according to this comforting and generous-sounding gem of relativism. Just, however, as in a computer some bits are more significant than others, some genetic differences are far more significant than others. So I've never been much convinced by the "small difference" argument to stop, despite the inevitable frowns at my supposed provincialism, believing that humans are, biologically as well as culturally, rather strange and wonderful as far as animals go.

When you think about it, from several points of view, apes are already a bit strange for mammals, and we are a quite strange kind of ape. Our cerebral cortex is three times as big as a chimp's, but that is hardly the most qualitative difference between ourselves and other apes. We are bipedal -- quite a rarity in mammals. Unlike almost all mammals and any near relative we are naked. We have vocal chords and speak grammatical language full of metaphor. We have something close to monogamy, again rare for mammals, and many of us seem to instinctively collect decorative objects -- AFAIK a habit shared with no other mammals but only a few birds. Then of course there are hands and technology -- with which we've done unprecedented things like strip other mammals of their fur so as to don it ourselves and keep our own otherwise preposterously exposed bodies warm. The facial evidence has always suggested that some rather improbable and important things happened during our evolution that didn't happen with other mammals.

Some genetic evidence for this human uniqueness has just been published. In particular, a very interesting RNA gene called HAR1F that operates during fetal development, and has been remarkably stable among almost all the other land vertebrates for the last 300 million years, has radically changed in the last 5 to 7 million years since our line split off from the chimps'.

> The difference between chickens and chimps - which are separated by 310 million years of evolution - is just two mutations out of a total DNA sequence of 118 "letters" of the genetic code. Yet the difference between chimps and humans - separated by 6 million years - is 18 mutations in the same DNA region.

I don't expect this to be the last revelation of improbable and fundamental genetic changes that occurred between chimps and humans.

I'm sure this will suggest to some intelligent intervention. There's already a big group of late night radio fans who think aliens intervened in human evolution, and it's also a good bet that religious "intelligent design" folks will use this finding as fodder. To me, it doesn't matter much how improbable we are, because we wouldn't be thinking about these things in the first place if it hadn't

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Nick Szabo

"A premier thinker about history, law and economics, and the lessons they have for security." -- Adam Shostack, Emergent Chaos

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happened. In any case, the small number of chemical changes that these researchers have found in the HAR1F gene are not, just by counting them, improbable. Their improbability can only be deduced from the fact that anything similar occurred so rarely among other land vertebrates. But you can't deduce from that fact that it's so improbable that it's a puzzle why it occurred at all.

The high improbability of our own evolution may actually make the alien-tinkering hypothesis less likely because it makes aliens less likely. If the evolution of intelligence is highly improbable this would substantially lower the factor f(i) in the Drake Equation, helping to explain the Fermi Paradox.

Another point to consider is that evolution often doesn't follow neat statistical distributions. Rather it exhibits leptokurtism, wherein one improbable changes often makes other otherwise improbable changes more likely to occur. Once one improbable change occured, functional synergy and the exploration of uncharted evolutionary territory made the others more likely to follow. The leading candidates for the first improbable change that triggered the others are bipedalism, monogamy, and nakedness, not vocal chords or brain size increase, which are known from the fossils to have occured much later than at least bipedalism. Thus I conclude that the HAR1F changes, most likely implicated in brain development, were probably a late set of changes in human evolution made possible by some earlier improbable genetic changes.

Posted by Nick Szabo at 11:26 PM

2 comments:

Alan said...

This is an old post and this probably won't be read, but...

First, humans aren't monogamous. Based on testicle size and some genetic evidence, apparently the usual ratio is two breeding women breed for every breeding man.

Monogamy is a relatively new phenomenon, most likely cultural.

Nakedness was probably a response to the skinning portion of our technology.

So my bet is on bipedalism. Apparently humans are simply fantastic endurance runners. We're well adapted to hounding prey into the ground during the hottest part of the day.

For instance our Achilles tendon is not shared with other apes, and I, for one, instinctively use it to store energy while jogging.

Bipedal endurance hunting could easily have set off social evolution which would in turn set off cranial expansion.

5:07 AM

Tryptophan said...

I agree with Alan. Not all modern human societies are regularly monogamous, the Yanomani are a good example. Lots of african groups are notorious for Men taking more interest in their sisters children than their "own".
His point about endurance running is interesting. Humans evolved in east africa, where endurance hunting is still common.

11:32 AM

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